[0016] The plurality of projections can preferably arranged in a substantially periodical manner in at least two directions.

[0017] When the plurality of projections are formed only in one direction in a substantially periodical manner, polarized light travelling orthogonal to the direction is hardly affected by the periodic structure of the projections. That is, reflection and diffraction of the polarized light are not reduced at the boundary between the air space and the transparent electrode. This problem can be solved by arranging the projections in a substantially periodical manner in at least two directions.

[0018] The plurality of projections can preferably have a pitch ranging from 10 to 100 nm.

[0019] The plurality of projections are preferably formed on the surfaces of the pair of transparent electrodes. In this case, the plurality of projections formed on the surface of one of the pair of transparent electrodes may have a pattern of the same as or different from that of the other transparent electrode.

[0020] The projection may be formed by providing a projection on the surface of the substrate and the transparent electrode may be formed over the projection of the substrate. Alternatively, the projection may be formed by providing a projection on the transparent electrode.

[0021] The touch panel may further include a plurality of spacers, between the pair of transparent electrodes, for keeping the spacing between the pair of transparent electrodes.

[0022] The touch panel may be any one of an analog resistive contact type, a digital resistive contact type, and an electrostatic capacitive coupling type.

[0023] An electronic device of the present invention can include a touch panel. The touch panel may have a lower substrate, a flexible input substrate opposing the lower substrate with a predetermined spacing therebetween, a lower transparent electrode with a predetermined pattern formed on the inner surface of the lower substrate, an input transparent electrode with a predetermined pattern formed on the inner surface of the input substrate so as to oppose the lower transparent electrode with a predetermined spacing therebetween, and a plurality of projections formed on the surface of at least one of the lower transparent electrode and the input transparent electrode with a substantially periodic pitch shorter than any wavelength of visible light.

[0024] In the touch panel of the electronic device, the light reflection and diffraction at the boundary between the air space and the transparent electrode can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The present invention will be described with reference to the accompanying drawings, wherein like numerals reference like elements, and wherein:

[0026] **FIG. 1** is an exploded perspective view of the overall structure of a touch panel according to a first embodiment of the present invention;

[0027] **FIG. 2** is a plan view of the overall structure of the touch panel according to the first embodiment of the present invention;

[0028] **FIG. 3** is a fragmentary exploded perspective view of the touch panel in an enlarged scale according to the first embodiment of the present invention;

[0029] **FIG. 4** is a fragmentary sectional view of the touch panel in an enlarged scale according to the first embodiment of the present invention;

[0030] **FIG. 5** is an illustration of a relaxation effect of a change in the effective refractive index in the region between an air space and an outer surface of a substrate by forming projections and depressions on an inner surface of a transparent electrode according to the first embodiment of the present invention;

[0031] **FIG. 6** is a plan view illustrating another pattern of the projections according to the first embodiment of the present invention;

[0032] FIGS. **7**(*a*) to (*h*) are perspective views, each illustrating a shape of the projections other than the shape shown in the above drawings, according to the first embodiment of the present invention;

[0033] **FIG. 8** is a fragmentary exploded perspective view of a touch panel in an enlarged scale according to a second embodiment of the present invention;

[0034] **FIG. 9** is a fragmentary sectional view of the structure of the touch panel according to the second embodiment of the present invention;

[0035] **FIG. 10** is a plan view of the overall structure of a touch panel according to a third embodiment of the present invention; and

[0036] **FIG. 11** is an exploded perspective view of the structure of a known touch panel.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0037] Embodiments of the present invention will now be described in detail.

[0038] The structure of an analog resistive contact-type touch panel according to a first embodiment of the present invention will be described with reference to FIGS. **1** to **4**. **FIG. 1** is an exploded perspective view of the overall structure of the touch panel according to the embodiment. **FIG. 2** is a plan view of the overall structure of the touch panel according to the embodiment. **FIG. 3** is a fragmentary exploded perspective view of the touch panel according to the embodiment in an enlarged scale. **FIG. 4** is a fragmentary sectional view of the touch panel according to the embodiment in an enlarged scale.

[0039] **FIG. 2** is a plan view wherein the touch panel is viewed from above an upper substrate of the touch panel such that a lower substrate and the upper substrate of the touch panel are staggered while being parallel to each other. **FIG. 3** is a perspective view of the lower substrate and the upper substrate alone, which will be described later, of the touch panel according to the embodiment. **FIG. 4** is a sectional view of the touch panel according to the embodiment taken along the line A-A' indicated in **FIG. 3**. Each layer and each member are drawn in a different scale in each drawing so as to be large enough to be visible.